Space Weather Forecast

Issued on Saturday, 18 May 2024 at 01:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further G1-G2/Minor-Moderate Geomagnetic Storms likely at first but waning. Chance of M-class flares, and Slight chance of isolated X-class flares throughout. Decreased chance of S1/Minor Solar Radiation storming.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity returned to Moderate levels following a Moderate flare at 17/2108 UTC from the large sunspot region AR3685 in the southeast.. There are currently 12 sunspots on the visible disc, 11 of which are numbered. The largest region on the disc is AR3685, which lies close to the southeast limb. This region is composed of a number of large spots, magnetic looping is visible across the region and as such it remains classed as one large sunspot group. A new region continues to emerge from the southeast limb, just to the north of AR3685. AR3679 is the second largest region, currently approaching the central disc, and has been the source of recent flare activity. AR3683 in the southwest is of modest magnetic complexity and continues to show spot development/emergence. The other sunspot regions are generally smaller, simpler and stable or in slight decay.

The Moderate flare at 17/2108 UTC from AR3685 produced a Coronal Mass Ejection (CME) subsequently visible across all imagery. We await coronagraph imagery for full analysis although a significant Earth directed component is though unlikely given the location of the region. No other Earth-directed CMEs were identified in available imagery.

Solar Wind / Geomagnetic Activity: Lingering CME effects persisted through the first half of the period, with a second CME arrival observed at 17/1240 UTC. Solar winds initially near background around 370-420km/s but rose sharply to become slightly elevated around 460-490km/s following CME arrival. The Interplanetary Magnetic Field (IMF), Bt, was at persistently moderate levels initially, and rose sharply following the CME arrival before slowly reducing. The north-south component Bz was initially moderately positive and remained so following the initial CME arrival, but subsequently fell to become generally negative to end the period. Geomagnetic activity was initially at Quiet levels (Kp 1-2), but rose to become Active following CME arrival, with G1 Minor Storm intervals recorded 17/1500-1800UTC and 17/2100-2400 UTC, and a G2 Moderate Storm interval recorded 17/1800-2100UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was below the S1/Minor Radiation storm levels and continued a slow decline.

Four-Day Space Weather Forecast Summary

Solar Activity: Continued Low to Moderate activity is expected, with a slight chance of isolated High activity. The sunspot region AR3685 in the southeast disc is considered to be the most likely source for any strong flare activity.

Solar Wind / Geomagnetic Activity: Current Coronal Mass Ejection (CME) influence is

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expected to ease through Day 1 (18 May). At this stage no further significant CMEs forecast to interact with Earth during the period. In the absence of further CME enhancements solar winds are expected to slowly from current slightly elevated levels towards background speeds though the period.

Further G1-G2/Minor-Moderate Storm intervals expected at first, before a gradual return to Quiet to Unsettled conditions through Day 1 (18 May) as CME influence is expected to wane. Activity thereafter is expected to be mainly Quiet with Unsettled intervals, although there remains a slight chance of Active to G1 minor Strom intervals throughout given lower than usual forecast confidence.

Energetic Particles / Solar Radiation: Solar radiation continues to decline and is expected to remain below S1/Minor storm levels. There is a persistent slight chance of further enhancement however should any large flares occur given the number of sunspot regions of the Earth-facing disc.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	80	20	10	10
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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